Brillouin Light Scattering in Dimethylbenzene Isomers at Various Temperature

Sh. Faizullaev[C,S]

Samarkand State University
703004 Samarkand, University blvd. 15, Uzbekistan
ANC2001@samarkand.uz or samudm@online.ru

Displacement and integral intensity of Brillouin light scattering components in ortho-, meta- and para-isomers of dimethylbenzene and dependence on temperature using as light source the He-Ne gas laser (λ=632,8 нm) and Fabry-Perot interferometer as recorded device were studied. The deconvolution method was used [1] for determination of the true value of integral intensity of line contour. A new method for determination of vibrational relaxation time by Landau-Plachek relationship is offered. With this purpose was generalized the Mountain's formula [2] for case of liquids with strong anisotropic molecules. The velocity of hypersound waves propagation was defined for the studied isomers using determinations of Brillouin components displacement.

Analysis of the results about lines half-width of Brillouin spectra in dependence from temperature shows that in all studied isomers the vibrational relaxation process predominates. The results obtained for vibrational relaxation time, taking into account the generalization of Mountain's formula, agree well with results of acoustic relaxation time obtained by ultrasonic methods [3].

The advantage of this method with reference to ultrasonic methods for determination of vibrational relaxation time for liquids with non-spherical shape molecules is shown.

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